Direct Exposure of Consumers to Personal Care Products

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Mo-S-A2: Assessing Exposures to Chemicals in Consumer Products: Databases, Models and Case Studies - II

Mo-S-A2-01
A Multi tier Approach to Characterizing Exposures to Cleaning Product Ingredients

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Abstract: Tiered approaches to the question of exposure begin with product-use-specific deterministic estimates for several scenarios, using previous studies of habits and practices, publicly-available concentration ranges or estimates thereof, and other previously-established parameters. This information was also used to populate distributions for probabilistic exposure analysis. These results were compared to those derived from multiple software packages (ECETOC TRA, EUSES, CONSEXPO), with sensitivity toward overlapping model parameters. Critical data gaps and uncertainties exist, and the impact of these uncertainties on safety assessment has been considered.

Keywords: A-exposure models, C-consumer products, A-exposure factors, A-risk assessment, A-activity patterns

Mo-S-A2-02
Direct Exposure of Consumers to Personal Care Products

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Abstract: Every consumer product has the potential to expose humans to chemical ingredients during use and via subsequent environmental emissions. To quantify these exposures to consumer products, several challenges need to be first addressed: What are the most suitable starting bases and metrics, how should limited data on chemical content in products be handled, and how should exposure be combined with ToxCast toxicity data? Production volumes are available for many chemicals but only a small and highly variable fraction of the chemicals produced are indeed incorporated into multiple products and ultimately reach consumers. Emissions can constitute another starting point, but the emission-based intake fraction concept needs to be adapted to enable a consistent application, for example direct dermal application of personal care products (PCPs). We propose to determine exposure as the mass of chemical in a product multiplied by the product intake fraction (PiF), defined as the fraction of the chemical in a product that is taken in by the human population. We demonstrate the use of this new metric, applying the dermal uptake model of Ten Berge to 25 chemicals found in PCPs, taking body lotion as a sentinel leave-on product potentially leading to PiFs between 2% and 100%, depending on chemical properties. Two alternatives are presented to inform risk assessment: a) Combining fractions of chemicals in PCPs with PCP usage and PiF, we forward calculate the exposure dose in mg/kg/day and compare it to the Oral Equivalency Dose (OED) calculated from ToxCast high throughput toxicity tests. b) We use the PiFs to back calculate maximum fractions in PCPs corresponding to the ToxCast OEDs and then compare them to measured or plausible ranges of chemical fractions in products. For about one third of the considered chemicals, their actual fraction in PCPs is higher than the fraction corresponding to the OEDs.

Keywords: A-exposure models, A-risk assessment, C-personal care products, C-consumer products, C-multimedia

Mo-S-A2-03
Specific Consumer Exposure Determinants (SCEDs): Refining Default Values in Screening Level REACH Assessments

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Abstract: The EU Registration, Evaluation and Authorization of Chemicals (REACH) regulation requires that conditions of safe use be specified for all uses EU classified substances are sold into. Meeting this regulation required a significant expansion of traditional hazard based approaches to incorporate exposure and risk elements. Key factors that enabled developing an approach and information to meet the REACH requirements on-time included stakeholder dialogue, common and consistent terminology, and implementation of a tiered and targeted approach to exposure and risk assessment. Within this approach, the European Center for Ecotoxicology and Toxicology of Chemicals Targeted Risk Assessment tool (ECETOC TRA) is a preferred